PHY 212 General Physics II - Electricity, Magnetism and Light
Summer 2007
Workshop - Week 1

Workshop 1 - Monday, July 02

1. The quantities given below are the ones you studied in PHY211 (Mechanics) course. Seperate them as vectors and scalars.

(i) Mass	(ii) Weight
(iii) Force	(iv) Momentum
(v) Energy	(vi) Work
(vii) Torque	(viii) Angular Momentum
(ix) Power	(x) Density
(xi) Speed	(xii) Acceleration

2. Three forces **F**, **G** and **H** are acting on a point particle of mass m initially at rest. The forces are $\mathbf{F} = (4i + 3j - 2k)$N, $\mathbf{G} = (j - 9k)$N and $\mathbf{H} = (i - k)$N ?
(i) What is the total force acting on the particle?
(ii) Will the particle continue to be at rest?
(iii) What is the magnitude of force **F**?
(iv) What is the angle between **F** and **G**?

3. A particle of mass m has velocity $\mathbf{v} = (v_x i + v_y j + v_z k)$m/s.
(i) Kinetic energy of the particle is given by

$$K = \frac{1}{2}mv^2 \tag{1}$$

Express K in terms of the velocity components and mass m.

4. An elementary particle of mass M, initially at rest, decays into three smaller particles of masses m_1, m_2 and m_3 with momenta $\mathbf{p}_1 = (2i + 7j - 3k)$kgm/s, $\mathbf{p}_2 = (-i + 5j - k)$kgm/s and $\mathbf{p}_3 = (xi + yj - zk)$kgm/s. Find x, y and z using the conservation of momentum.

5. The angular momentum **L** is given by

$$\mathbf{L} = \mathbf{r} \times \mathbf{p} \tag{2}$$

(i) Find the angular momentum if $\mathbf{r} = (0,\ 4,\ 1)$m and $\mathbf{p} = (-3,\ -1,\ 0)$kgm/s
(ii) What is the angle between **r** and **p**?

6. Consider two electrons separated by a distance r. They exert a repulsive electrical force between each other and an attractive gravitational force as well. Compute the ratio of the magnitudes of these two forces.